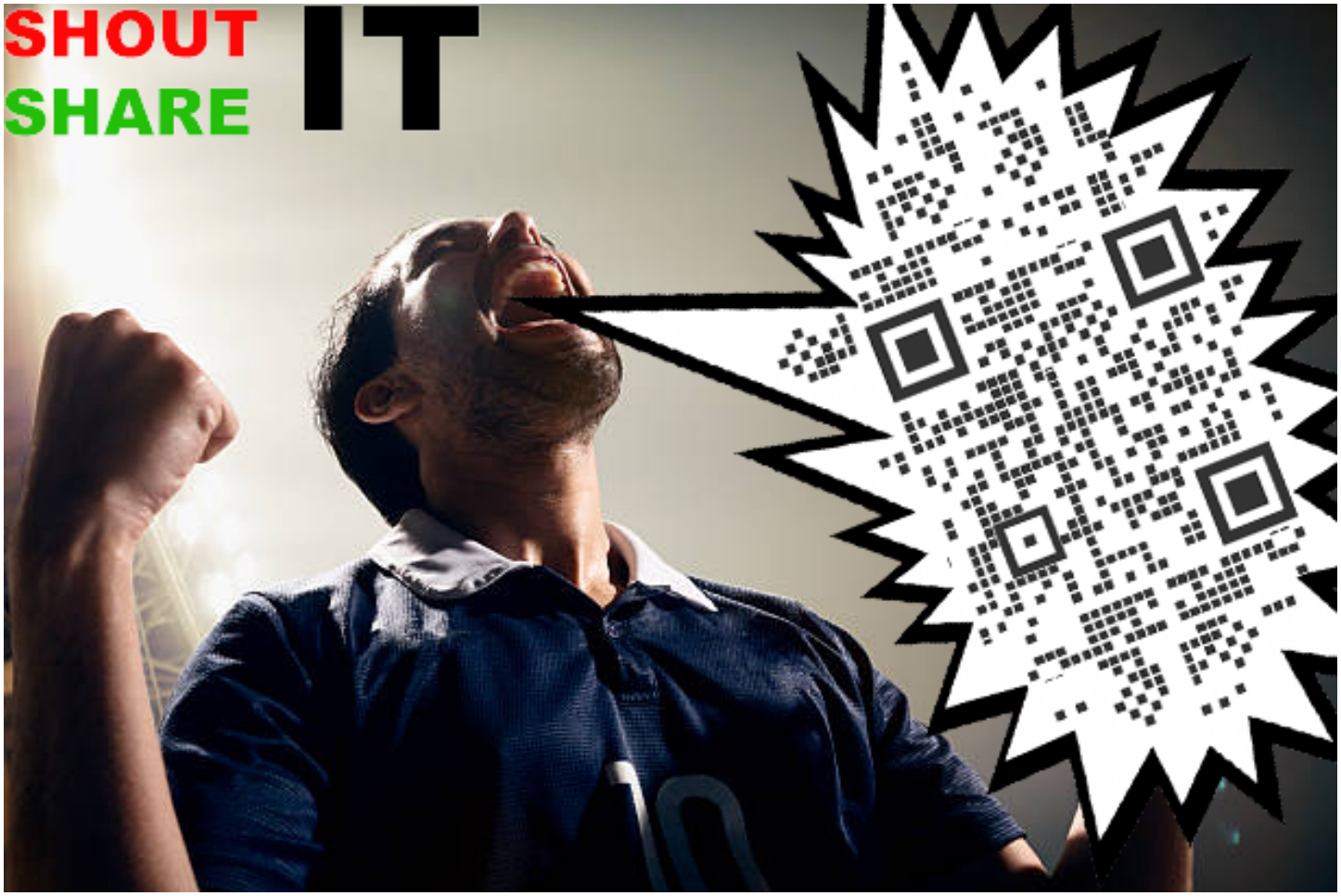
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NEW HAMPSHIRE COLLEGE

AGRICULTURAL EXPERIMENT STATION

ANALYSES OF FERTILIZERS AND WOOD ASHES

BY FRED. W. MORSE

EXPERIMENT STATION BUILDING

NEW HAMPSHIRE COLLEGE
OF
AGRICULTURE AND THE MECHANIC ARTS
DURHAM, N. H.

NEW HAMPSHIRE COLLEGE

OF

AGRICULTURE AND THE MECHANIC ARTS

AGRICULTURAL EXPERIMENT STATION

DURHAM, N. H.

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The Bulletins of this Station are sent to any resident of New Hampshire upon application.

COMMERCIAL FERTILIZERS AND WOOD ASHES

BY FRED W. MORSE

This station has not been accustomed to publish the results of the analyses of fertilizers made under the state laws; but the figures have been returned to the Secretary of the Board of Agriculture when the examination has been completed. Many requests for the results have been received however, from both buyers and sellers and it has therefore been considered necessary to publish them in a bulletin.

The samples of fertilizers, the analyses of which are reported in the following pages, were received from the Secretary of the Board of Agriculture, together with the names of the brands represented by the different packages. By agreement with the Secretary, a composite sample was prepared of any brand which was represented by two or more packages, instead of making a separate analysis of each sample.

The station chemist assumes no responsibility for the samples before their arrival at the laboratory, and in no case was he informed of the guaranteed composition of the different brands.

The division of responsibility in the matter of collecting and analyzing samples of fertilizers under the present state laws, is liable to produce results which will be unsatisfactory to both buyer and seller.

It is the opinion of the station chemist that the fertilizer control in this state should be placed in the hands of the experiment station, as is done in all of the neighboring states.

It seems worth while to call the attention of farmers to several brands with fanciful names which contain very low percentages of nitrogen and potash and whose fertilizing constituents are mainly the different forms of phosphoric acid. These brands are probably sold for a lower price than the standard kinds. The buyer will without doubt get the worth of his money in such fertilizers; but their composition is too one-sided for most of our New Hampshire soils.

COMPOSITION OF FERTILIZERS SOLD IN NEW HAMPSHIRE IN 1894

Collector's Number	NAME	Number of Packages	Total Nitrogen	Soluble Phosphoric Acid	Reverted Phosphoric Acid	Insoluble Phosphoric Acid	Available Phosphoric Acid	Total Phosphoric Acid	Potash
1	Bradley Fertilizer Co., X L	14	2.45	5.82	3.72	2.39	9.54	11.93	2.25
2	" " Potato	10	2.17	3.41	2.80	1.72	6.21	7.93	4.77
3	" " Corn	2	2.04	4.37	4.30	3.26	8.67	11.93	1.69
6	" " Top Dressing	1	4.82	1.73	3.80	2.37	5.53	7.90	2.51
7	" " Eclipse	2	1.55	4.29	5.40	2.62	9.69	12.31	1.74
8	" " Coe's Original	2	1.94	6.64	3.35	1.54	9.99	11.53	1.95
11	Crocker Fert. and Chem. Co., New Rival	2	1.34	6.58	2.39	1.47	8.97	10.44	1.96
12	" " " Potato	5	2.19	6.97	1.87	2.05	8.84	10.89	3.35
13	" " " Corn	4	2.00	6.66	2.49	2.40	9.15	11.55	1.94
14*a*	Bowker Fertilizer Co., Potato	7	3.01	4.66	3.43	3.62	8.09	11.71	5.58
14*b*	" " Stockbridge's Potato	4	3.54	4.85	1.96	4.00	6.81	10.81	6.20
15	" " Corn	4	3.30	5.18	3.41	3.36	8.59	11.95	4.03
20	" " Top Dressing	3	4.96	1.82	3.08	4.93	4.90	9 83	5.97
21	" " Seeding Down	1	2.41	3.81	3.33	5.82	7.14	12.96	9.32
22	" " Sure Crop	6	0.82	1.19	6.00	4.96	7.19	12.15	1.19
23	" " Farm and Garden	5	1.72	2.62	5.21	4.19	7.83	12 02	2.17
24	" " Hill and Drill	7	2.50	4.80	4.12	4.35	8.92	13.27	2.06
26	Cleveland Dryer Co., Cleveland Phosphate	1	2.00	6.11	2.85	1.34	8.96	10.30	2.18
27	E. Frank Coe, High Grade	4	2.10	7.47	1.13	2.69	8.60	11 29	2.38
28	" " Potato	3	1.80	5.89	2.02	3.79	7.91	11.70	3.14
29	" " Columbian	1	1.26	7.50	2.64	2.56	10.14	12.70	2.47
30	" " Grain and Grass	2	1.06	5.33	3.67	4.96	9.00	13.96	1.54
33	Pacific Guano Co., Pacific Guano	4	2.29	5.31	3.78	2.65	9.09	11.74	2.24
36	Quinnipiac Co., Corn	1	2.56	7.08	2.35	2.31	9.43	11.74	1.90

COMPOSITION OF FERTILIZERS SOLD IN NEW HAMPSHIRE IN 1894, CONTINUED

37	Quinnipiac Co., Potato	1	2.54	7.31	2.32	2.50	9.63	12.13	1.90
38	Lister's Success	1	1.91	4.57	3.37	3.80	7.94	11.74	2.11
39	Standard Fertilizer Co., Potato	1	2.23	5.15	5.74	1.57	10.89	12.46	3.05
40	" " Standard	1	2.21	5.05	4.47	1.85	9.52	11.37	2.42
41	Cumberland Bone Co., Cumberland	2	2.18	6.08	3.23	1.46	9.31	10.77	2.05
42	Williams & Clark, Potato	1	2.19	6.21	3.28	2.43	9.49	11.92	3.16
43	" " Americus	2	2.39	7.55	2.00	1.44	9.55	10.99	2.48
44	Clarke's Cove Co., King Philip	1	1.25	5.79	2.78	1.77	8.57	10.34	1.88
45	" " Bay State	2	2.20	5.48	3.74	2.62	9.22	11.84	2.25
46	John S. Reese Co., Pilgrim	1	1.34	2.67	4.98	1.74	7.65	9.39	2.92
47	" " Mayflower	1	1.82	4.29	5.33	3.04	9.62	12.66	2.63
48	Walker, Stratman & Co., Potato	1	1.16	5.35	3.11	3.95	8.46	12.41	2.19
49	" " Four Fold	1	2.46	4.35	1.68	3.10	6.03	9.13	1.20
50	Darling Fertilizer Co., Potato and Root	1	2.65	3.60	2.92	4.80	6.52	11.32	5.93
51	" " Corn and Wheat	1	2.15	5.50	3.47	3.76	8.97	12.73	2.45
52	" " Animal Fertilizer	1	2.71	2.84	3.17	4.90	6.01	10.91	4.59
53	D. C. Hawes, Granite State	1	2.34	2.01	3.25	4.03	5.26	9.29	5.74
54	Ames Fertilizer Co., Plymouth Rock		3.33	4.35	6.32	1.07	10.67	11.74	3.93

NOTE.—Each sample of fertilizer, when received at the laboratory, was inclosed in a tin box and bore a label stating the name of the fertilizer and its manufacturer. When a fertilizer was represented by two or more samples, the tin boxes were received bound together in a bundle, which bore the name of the manufacturer and the variety and number corresponding to that in the list received from the secretary of the board of agriculture. Bundle No. 14, labelled "Bowker Fertilizer Co., Potato," contained eleven boxes, four of which proved to be labelled "Stockbridge's Potato," while the remaining seven were marked "Potato." Therefore two composite samples, one from four boxes and the other from seven boxes, were prepared and numbered 14*a* and 14*b*. It will be noticed that there is considerable difference in the composition of the two lots. Attention is also called to Numbers 36 and 37. Though labelled differently, they evidently represent but one variety of fertilizer.

COMPOSITION OF WOOD ASHES

Since the publication of our last annual report six samples of wood ashes have been received and analyzed with the following results:

		Moisture.	Soluble Potash.	Total Phosphoric Acid.
229	Canada Ashes, from Plymouth..	17.16	2.38	1.05
236	Local Ashes, from Gonic.....	1.96	3.76	1.46
250	Canada Ashes, from Gonic.....	10.80	3.10	1.43
251	Canada Ashes, from Gonic.....	11.70	3.85	1.15
253	Canada Ashes, from Gonic.....	6.05	3.99	1.47
254	Canada Ashes, from Gonic.....	10.70	3.47	1.01

During the past year there have been reported 161 analyses of wood ashes by the New England experiment stations. By scanning and arranging these results some knowledge of the general quality of ashes used by our farmers may be obtained. The various figures have been grouped within different limits, in order to find out the most common composition rather than the average. The grouping of results is as follows:

Number of samples.		Per cent of potash.
23	under	4
58	between	4 and 5
38	between	5 and 6
23	between	6 and 7
19	over	7

Out of these 161 samples it may at once be seen that the most common percentages of potash were from 4 to 5, or from 80 to 100 pounds of potash in one ton of ashes. A large majority of the samples contained between 1 and 2 per cent of phosphoric acid, or from 20 to 40 pounds in one ton. These figures would yield, at the station valuations, a value of between $5.20 and $7.25 for the potash and phosphoric acid most commonly found in one ton of wood ashes.

Among the above mentioned samples 31 were reported as

"Canada hard wood ashes." These samples have been grouped by themselves within the same limits, as follows:

Number of samples.		Per cent of potash.
6	under	4
15	between	4 and 5
3	between	5 and 6
4	between	6 and 7
3	over	7

The variation in quantity of water in ashes was remarkable, ranging from less than 1 per cent to over 30 per cent. Seventeen samples showed over 20 per cent, or 400 pounds of water in one ton. The most common amount was between 10 and 12 per cent, or from 200 to 240 pounds per ton. One sample received at this station yielded over 500 pounds of water per ton, and it is scarcely necessary to state that the purchaser of those ashes was dissatisfied with his bargain.

REGULATIONS CONCERNING ANALYSES

The act of congress establishing experiment stations provides that they shall, among other things, study the chemical composition of useful plants, soils and water, manures natural or artificial, the different kinds of food for domestic animals, products of the dairy, and such other substances connected with the agricultural industry as may in each case be deemed advisable.

The board of trustees has therefore passed resolutions regarding the performance of chemical work by the station for the people of the state, which are substantially as follows: The experiment station will analyze substances coming within the limits of the above act which are sent by parties within the state, whenever it appears that the analyses will be of interest to the public or of value in connection with the experimental work of the station. Such substances will receive attention in the order in which they arrive, and must be sent with express or postal charges prepaid. Parties sending substances for analyses may be required to furnish such information with regard to them as the officers of the station may deem necessary to make the results of greatest value to the public.

It is plainly to be seen that to have analytical work of any value, samples must truthfully represent the lots from which they are taken. Therefore care must be used that the samples are taken from the whole and not a portion of the lot. Below are a few simple directions for

SAMPLING FERTILIZERS AND ASHES.

If the material is in a heap, small portions, about a cupful, should be taken from different parts of the pile, inside as well as outside, and poured upon a paper or clean board. The small pile should then be thoroughly mixed, after which a sample of about one pint should be taken from it and put into a fruit jar or tight tin box. If the material is in bags or barrels, a quart or more should be taken from each of several packages between the surface and centre, and mixed and sampled as above.

APPENDIX

PUBLIC STATUTES OF NEW HAMPSHIRE

CHAPTER 126

FERTILIZERS

Section 20. Every person manufacturing or importing fertilizers to be sold or offered for sale within this state shall obtain a license from the state treasurer, countersigned and recorded by the secretary of the board of agriculture, authorizing such sale. The license shall be for one year, and the party to whom it is granted shall pay therefor fifty dollars, for the use of the state.

Sect. 21. Every such person shall cause to be affixed to every bag, barrel, or parcel of fertilizer to be sold or offered for sale within this state, a written or printed label which shall correctly state his name, his place of business, the number and date of his license, the name of the fertilizer, the date of its manufacture, the percentage of ammonia, nitrogen, soluble phosphoric acid, insoluble phosphoric acid, potash, and its other constituent parts, and the words, "State of New Hampshire—Licensed." By the term "soluble phosphoric acid" is meant such acid in any form or combination when readily soluble in pure water; and by "insoluble phosphoric acid," such as requires the action of acid to render it thus soluble.

Sect. 22. Any manufacturer or importer of fertilizers for sale within this state who does not obtain a license authorizing such sale, or affix to the bags, barrels, or parcels of fertilizers to be sold or offered for sale in this state a label containing the information required by the preceding section, or who affixes a label to such packages containing false information as to any of said particulars, shall forfeit five hundred dollars for each offense, one half for the use of the prosecutor, and the other half for the use of the state.

Sect. 23. Any person who sells or keeps for sale any fertilizer not labeled as required by Section twenty-one of this chapter, or which has a label affixed thereto giving false information as to any of said particulars, or the sale of which is not duly licensed, shall be fined twenty dollars for the first offense and forty dollars for each subsequent offense, one half for the use of the prosecutor, and the other half for the use of the state.

Sect. 24. The money received for license fees by virtue of Section twenty of this chapter is appropriated for the following purposes: A sufficient sum to pay the College of Agriculture and the Mechanic Arts the actual expenses of making analyses of fertilizers and other substances submitted to the college by the board of agriculture for analysis, and the balance thereof to pay the expenses of farmers' meetings held in winter months under the authority of the board of agriculture.

CHAPTER 12

STATE BOARD OF AGRICULTURE

SECTION 9

DUTIES OF THE SECRETARY

Line 11. He shall collect samples of fertilizers sold in this state, and any other articles which the interests of agriculture may require, and submit them to the College of Agriculture and the Mechanic Arts, for chemical analysis.

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